



101GR2004/004470



INVESTOR IN PEOPLE

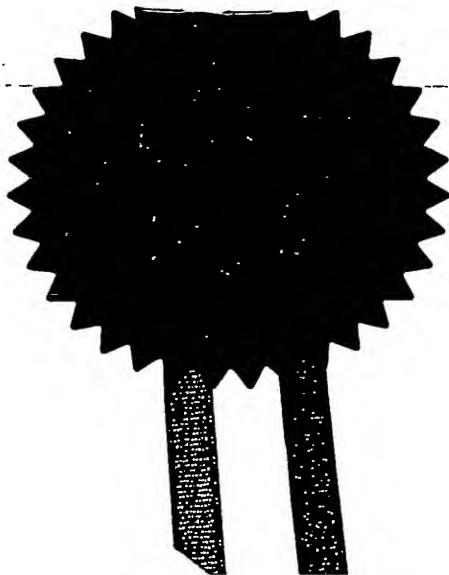
The Patent Office  
Concept House  
Cardiff Road  
Newport  
South Wales  
NP10 8QQ

I, the undersigned, being an officer duly authorised in accordance with Section 74(1) and (4) of the Deregulation & Contracting Out Act 1994, to sign and issue certificates on behalf of the Comptroller-General, hereby certify that annexed hereto is a true copy of the documents as originally filed in connection with the patent application identified therein.

In accordance with the Patents (Companies Re-registration) Rules 1982, if a company named in this certificate and any accompanying documents has re-registered under the Companies Act 1980 with the same name as that with which it was registered immediately before re-registration save for the substitution as, or inclusion as, the last part of the name of the words "public limited company" or their equivalents in Welsh, references to the name of the company in this certificate and any accompanying documents shall be treated as references to the name with which it is so re-registered.

In accordance with the rules, the words "public limited company" may be replaced by p.l.c., plc, P.L.C. or PLC.

Re-registration under the Companies Act does not constitute a new legal entity but merely subjects the company to certain additional company law rules.



Signed

Dated

*R. Mahoney*  
20 December 2004

EST AVAILABLE COPY

## Request for grant of a patent

(See the notes on the back of this form. You can also get an explanatory leaflet from the Patent Office to help you fill in this form)

04DEC03 E856946-1 D03052  
P01/7700 0.00-0328035.1

The Patent Office  
Cardiff Road  
Newport  
Gwent NP10 8QQ

1. Your reference

A30428

2. Patent application number

*(The Patent Office will fill in this part)*

0328035.1

- 3 DEC 2003

3. Full name, address and postcode of the or of each applicant *(underline all surnames)*

BRITISH TELECOMMUNICATIONS public limited company  
81 NEWGATE STREET  
LONDON, EC1A 7AJ, England  
Registered in England: 1800000

Patents ADP number *(if you know it)*

1867002

If the applicant is a corporate body, give the country/state of its incorporation

UNITED KINGDOM

4. Title of the invention

COMMUNICATIONS METHOD AND SYSTEM

5. Name of your agent *(if you have one)*

"Address for Service" in the United Kingdom to which all correspondence should be sent  
*(including the postcode)*

Patents ADP number *(if you know it)*

BT GROUP LEGAL  
INTELLECTUAL PROPERTY DEPARTMENT  
HOLBORN CENTRE  
120 HOLBORN  
LONDON, EC1N 2TE

1867001 8891947001

BT Group Legal  
Intellectual Property Department  
BT Centre  
81 Newgate Street  
LONDON EC1A 7AJ

6. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and *(if you know it)* the or each application number

Country

Priority application number  
*(if you know it)*Date of filing  
*(day / month / year)*

7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application

Number of earlier application

Date of filing  
*(day/month/year)*8. Is a statement of inventorship and of right to grant of a patent required in support of this request? *(Answer 'Yes' if:*

YES

- a) any applicant named in part 3 is not an inventor, or
- b) there is an inventor who is not named as an applicant, or
- c) any named applicant is a corporate body.

*(See note (d))*

9. Enter the number of sheets for any of the following items you are filing with this form.  
Do not count copies of the same document

Continuation sheets of this form -

Description - 12

Claim(s) - 04

Abstract - 01

Drawing(s) - 03 x 23

---

10. If you are also filing any of the following, state how many against each item

Priority Documents

Translations of priority documents

Statement of inventorship and right to grant of a patent (Patents Form 7/77)

Request for preliminary examination and search (Patents Form 9/77)

1

Request for substantive examination (Patents Form 10/77)

Any other documents (please specify)

I/We request the grant of a patent on the basis of this application.

Signature(s)

Date:

03 December 2003

NJ Wallin **WALLIN, Nicholas James, Authorised Signatory**

---

11. Name and daytime telephone number of person to contact in the United Kingdom

**Rod HILLEN**

**020 7492 8140**

**Warning**

After an application for a patent has been filed, the Comptroller of the Patent Office will consider whether publication or communication of the invention should be prohibited or restricted under Section 22 of the Patents Act 1977. You will be informed if it is necessary to prohibit or restrict your invention in this way. Furthermore, if you live in the United Kingdom, Section 23 of the Patents Act 1977 stops you from applying for a patent abroad without first getting written permission from the Patent Office unless an application has been filed at least 6 weeks beforehand in the United Kingdom for a patent for the same invention and either no direction prohibiting publication or communication has been given, or any such direction has been revoked.

**Notes**

- a) If you need help to fill in this form or you have any questions, please contact the Patent Office on 0645 500505.
- b) Write your answers in capital letters using black ink or you may type them.
- c) If there is not enough space for all the relevant details on any part of this form, please continue on a separate sheet of paper and write "see continuation sheet" in the relevant part(s). Any continuation sheet should be attached to this form.
- d) If you have answered 'Yes' Patents Form 7/77 will need to be filed.
- e) Once you have filled in the form you must remember to sign and date it.
- f) For details of the fee and ways to pay please contact the Patent Office.

## Communications Method and System

## Technical Field

The present invention relates to a communications method and system which

5 uses speech recognition technology to analyse a voice message so as to determine its intended destination.

## Background to the Invention and Prior Art

Mobile packet based half-duplex voice messaging systems are known in the art.

10 Referred to colloquially as "push-to-talk" (PTT) systems, they have been commercially available within the United States for some years, provided by Nextel Communications, under the service mark "Direct Connect". A general description of the operation of such a system was available before the priority date at <http://howstuffworks.lycoszone.com/question530.htm/printable>.

15 Such PTT systems have also been developed to operate within an internet protocol (IP) environment, with voice over IP (VoIP) systems. In particular both General Packet Radio Services (GPRS) and Code Division Multiple Access (CDMA) based VoIP PTT systems are known in the art, such as those produced by Motorola (see [http://www.motorola.com/mediacenter/news/detail/0,1958,3069\\_2512\\_23.00.html](http://www.motorola.com/mediacenter/news/detail/0,1958,3069_2512_23.00.html)) and

20 Qualcomm (see [http://www.qualcomm.com/qis/docs/qchat\\_whitepaper.pdf](http://www.qualcomm.com/qis/docs/qchat_whitepaper.pdf)).

When using a PTT system, usually a user will select the intended receiver from an address book list maintained on his own handset using a graphical interface and the device's own user controls, as is well known in the art. It is also known to provide for voice dialling of PTT services, however, and an example prior art device which provides such functionality is the pocket adapter produced by Cellport Systems Inc. of Boulder, CO, for the Motorola iDEN i1000 and i1000 plus mobile telephones. The user guide for the Cellport pocket adapter can be found at <http://www.cellport.com/adapters/20999851-01B%20i1000%20PAG.pdf>. As set out therein, such voice dialling comprises the user speaking predetermined code words, followed by the identification (such as the number, but alternatively a speed dial code) of the receiver which the user wishes to connect to, before the voice message which the user wishes to send is spoken. For example, in the Cellport system, using voice dialling a user would speak the words "Cellport, dial, pound, pound, 6284". The adapter then repeats the recognised words "pound, pound, 6284", and then the connection process is performed. The user can then speak his message by pressing the PTT button in the usual way.

Even with such voice dialling functionality, however, there is still a separate "dialling phase", where the user must select the intended recipient, either by using a normal graphical interface, or by using the voice dialling interface, and it is not until such dialling phase has been completed and a connection established that the user may speak 5 his first message. This separate dialling phase therefore introduces a delay in allowing a user to speak his message, and also necessitates additional user interaction with the device, either in the form of navigating the graphical displays, or by speaking in accordance with the voice dialling protocols.

10 Summary of the Invention

The invention aims to improve on the above described operation by removing the separate dialling phase from the user interface. More particularly, the invention makes use of speech recognition and associated technology to analyse a spoken message so as to identify an intended receiver for the message, and to transmit the message or at least a 15 variant thereof (such as the text of the message as obtained by the speech recogniser) towards the intended recipient via a network. This allows a user to simply push the PTT button on his handset and immediately speak his message (preferably including within his message some indication of the intended recipient, such as a name or the like), without having to undergo a separate dialling phase beforehand.

20 In view of the above, from a first aspect there is provided a communications method comprising the steps of:-

receiving a voice message containing an utterance;

buffering the received message;

25 performing a speech recognition process on the received voice message to recognise the utterance contained therein;

determining, if possible, an intended receiver of the message in dependence on the recognised utterance; and

30 if an intended receiver was determined, transmitting the message to the determined intended receiver using a half-duplex communications service provided by a packet-switched network.

As set out above, the invention provides the advantage that no separate dialling phase need be undertaken before a user may speak the message. This enhances the communication experience for the user, and makes the half-duplex communications service more pleasant and user friendly to use.

In an embodiment of the invention, when the determining step determines one or more possible intended receivers from the recognised utterance, the method further preferably comprises the steps:

- 5 indicating the one or more possible intended receivers to a user; and
- receiving a selection signal from the user indicating the one or more determined possible intended receivers to which the message should be transmitted.

Thus, where the determining step has identified one or more potential intended recipients for a message, clarification of which of the identified possible intended recipients may be sought from the user. Preferably, for ease of interface, the indicating 10 step further comprises generating an audio speech prompt corresponding to the plurality of possible intended receivers; and outputting the generated audio speech prompt to the user. Such a further feature allows for an audio output prompt from the user device.

Moreover, in embodiments of the invention the speech recognition process is preferably performed only on a portion of the received voice message. Such a feature 15 recognises that it is likely that the intended recipient of a message will be indicated probably at the start of a message (e.g. consider the message "Hi Roger, are you going to the pub this evening?" – the intended recipient ("Roger") is identified in the first phrase), and hence speech recogniser resources may be conserved by performing only that amount of recognition which is necessary.

- 20 Furthermore, in embodiments of the invention the further steps of: receiving an indication of the identity of a user who generated the message; and selecting a user-dependent speech grammar for use by the speech recognition process in dependence on the identity of the user are included. This allows a user-specific grammar to be used with the speech recognition process, which grammar may have encoded therein address book 25 data and the like.

Additionally, embodiments of the invention may further comprise the steps of receiving a speech recognition activation signal from a user, wherein the speech 30 recognition and determining steps are performed in dependence on the receipt of such a signal. Such functionality allows a user to explicitly indicate when a message is a message to a new recipient, and hence that the speech recognition and receiver determination steps should be performed. This further improves the efficiency of use of speech recogniser resources, and also improves the overall operation of the invention, as the speech recognition and receiver determination steps will only be performed on messages (typically first messages in a thread) for which there is a high likelihood that 35 some sort of receiver identity such as a name or the like will be spoken therein, and

hence a correspondingly high likelihood that the intended recipient will be capable of determination.

Brief Description of the Drawings

5 Further features and advantages of the present invention will become apparent from the following description of an embodiment thereof, presented by way of example only, and by reference to the accompanying drawings, wherein:-

Figure 1 is an architectural system block diagram of an embodiment of the present invention;

10 Figure 2(a) is flow diagram illustrating the method steps involved in the embodiment of the invention; and

Figure 2(b) is a flow diagram continuing the flow diagram of Figure 2(a).

Description of the Embodiment

15 An embodiment of the present invention will now be described with respect to Figures 1, 2(a) and 2(b).

The embodiment of the invention provides a voice steered push to talk (PTT) service. More particularly, the embodiment of the invention is intended to provide a push to talk communication service which may use any of the PTT communications 20 technologies already known in the art and discussed in the introductory portion to this specification, and which then adds thereto functionality which allows the push to talk communications to be directed to an intended recipient or destination without undergoing any explicit dialling phase. Instead, within embodiments of the invention, speech 25 recognition is performed on the spoken messages and a speech grammar applied to determine intended recipients or destination of the message, the message then being forwarded to the intended recipient or destination thus determined.

In view of the above, Figure 1 illustrates an overall system architectural block diagram illustrating the main system elements of an embodiment according to the present invention. With reference to Figure 1, therefore, within the embodiment of the invention 30 there is provided an audio router server 14 which is arranged to receive streamed digital audio signals carried by a PTT communication service on a network (not shown) from PTT-enabled handsets, as well as calling line identifier (CLI) information. The audio router server 14 is provided with an audio buffer 142, being a data storage medium such as RAM, a hard disk, an optical storage medium, or the like, and which is intended to 35 store any received audio messages therein temporarily. Additionally provided by the

embodiment is a speech recognition server 18, which is arranged to receive digital audio from the audio buffer 142 at the audio router server together with the CLI information, and also to receive speech grammar and lexicon data for use in a speech recognition process, from an address book and grammar database 20. In use, the speech recognition server

5 18 runs a speech recognition application to apply a user specific grammar to the digital audio received from audio buffer 142, so as to recognise any spoken utterance therein, and determine an intended recipient. It should be noted that the speech recognition application run by the speech recognition server may be any speech recognition application presently known in the art, but preferably a speaker independent speech

10 recognition application. Suitable speech recognition software which was available before the priority date and which may be used by the speech recognition server 18 in the present embodiment is Nuance 7, from Nuance Communications Inc, of 1005 Hamilton Court, Menlo Park, CA 94025.

The speech recognition server 18 is further arranged to pass a recognition result, being preferably a set of key-value pairs representing the values of particular grammar slots in the recognised speech together with their associated recognition confidence values, to a recipient determination server 16. The recipient determination server is arranged to receive the key-value pairs, and to take action appropriately dependent on the key value pairs returned by the recogniser, as will be described later. One of the possible actions which the recipient determination server can perform is to pass an address in the form of a Dialled Number Identifier (DNI) to the audio router server 14. Additionally, the recipient determination server 16 is further arranged to receive calling line identifier (CLI) data from user handsets (described later) and also to send shortlist information to user handsets, as will also be described later.

25 Returning to a consideration of the address book and grammar database 20, this stores, for each registered user of the system, a speech recognition grammar which encodes address book data relating to names of possible recipients and their respective DNIs. A separate user specific grammar is stored for each registered user. An example format for a grammar is shown below:-

30

Names

(

[

( bob ) { return("Bob Smith +447711123456") }

35

( peter jones ) { return("Peter Jones +447722123456") }

```
( pete ) { return("Pete Brown +447733123456") }  
]  
)
```

5

```
Phonemes:filler
```

```
[
```

```
ph1
```

```
ph2
```

10 ...

```
ph41
```

```
]
```

```
Fillers:filler
```

15 [

```
    Phonemes
```

```
    @-@
```

```
]
```

20 EndCall

```
[
```

```
    end call
```

```
    over and out
```

```
]
```

25

```
Overall
```

```
[
```

```
    ( ?hi +Names:n ?(it's Bob) *Fillers) {<action "placecall">  
    <recipient $n>}
```

30 \*Fillers

```
    EndCall {<action "endcall">}
```

```
]
```

The creation of the dialling grammar may be by any of the well known techniques using either text (e.g. getting a copy of user telephone's address book) or combination of the address book for the number part and spoken input to define the name pronunciation.

The above description relates to the various servers which are preferably contained within or form part of a network providing the half duplex PTT communications service. In order to describe the operation of the embodiment in more detail, however, it is necessary also to describe the special features of the mobile user handsets adapted for use with the present invention. Figure 1 also illustrates such a handset, in the form of mobile station A (10). Mobile station B (12) is also shown, but this may be a conventional PTT enabled handset, as is already known in the art.

Referring therefore to mobile station A (10), the mobile station A (10) is provided with a PTT audio client A (102), being the appropriate software to control mobile station 10 to provide conventional PTT functionality. That is, the PTT audio client A (102) enables the mobile station 10 to use a PTT service in a conventional manner. The main difference with the prior art, however, is that the PTT audio client A (102) is arranged to send the digitised audio data produced by the handset A to the audio router server 14, together with the calling line identifier of the mobile station 10.

Additionally provided within the mobile station 10 is a visual selector client A (104). This is a further software program which is arranged to interface with the recipient determination server 16 within the network, so as to send the calling line identifier (CLI) of the mobile station 10 thereto when a PTT call is first initiated, and also to receive a list of candidate recipient identities from the recipient determination server 16, in the event that more than one intended recipient is determined thereby. The visual selector client A (104) is further arranged to display such a short list of candidates to the user on a display of the mobile station A, and to permit the user to select the intended recipient. Selection information is then transmitted back to the recipient determination server 16.

Within the conventional mobile station B (12), a PTT audio client B (122) is provided, which is essentially the same as the PTT audio client A (102) provided in the mobile station 10. The PTT audio client B (122) is arranged to provide the mobile station B (12) with conventional PTT functionality, and the only difference between the PTT audio client B (122) and the prior art is that the PTT audio client B (122) is arranged to receive a PTT message from the audio buffer 142 which is part of the audio router server 14. In all other respects, the mobile station B12 may be conventional.

The operation of the embodiment of Figure 1 will now be described with respect to Figures 2(a) and (b).

In this example description of the operation of the embodiment, let us assume that mobile station A does not have any PTT calls in progress, and wishes to send a PTT message to mobile station B. That is, the present state of mobile station A is that it has not sent or received any PTT calls to any other station for at least a PTT timeout period 5 (usually 20 seconds). In view of this, within the embodiment of the invention in order to initiate a call from mobile station A to mobile station B at step 2.2 user A presses the PTT button. The pressing of the PTT button on the mobile station A causes the PTT audio client 102 to start running, as well as the visual selector client 104. At step 2.4 the visual selector client 104 connects to the recipient determination server 16, and sends the calling 10 line identifier (CLI) of the mobile station A to the recipient determination server 16. Next, (or almost simultaneously or beforehand - the order of steps 2.4 and 2.6 is not important) the PTT audio client 102 connects to the audio router server 14, and starts streaming digitised audio to the audio router server 14. It is at this point, at step 2.6, that user A of 15 mobile station A speaks the message which he wishes to be transmitted by the PTT service, and the mobile station A digitises and packetises the message for streaming in the audio stream to the audio router server 14. Such digitisation and packetisation is well known in the art. In addition to streaming the audio to the audio server 14, the PTT audio client 102 also sends the calling line identifier (CLI) of the mobile station A to the audio router server 14.

20 At step 2.8, the audio router server buffers the received audio stream in the audio buffer 142, and also forwards a copy of the audio stream to the speech recognition server 18, at step 2.10. At the same time, the audio router server 14 also sends the mobile station A calling line identifier to the speech recognition server 18.

25 Next, at step 2.12, the speech recognition server 18 uses the received calling line identifier of the mobile station A to access the address book and grammar database 20, so as to retrieve therefrom the specific user grammar which is stored therein for the mobile station A. It will be appreciated that the speech recognition grammar and lexicon is stored in the address book and grammar database 20 indexed by CLI, to allow for the grammar and lexicon specific to the mobile station A to be retrieved.

30 Next, at step 2.16 the speech recognition server 18 performs a speech recognition process on the audio stream received from the audio router server 14. Note that the speech recognition server 18 may perform speech recognition on the received audio stream as the stream is received, or alternatively may wait until silence is detected in the stream before commencing recognition [ or the end of the stream when the PTT 35 button is released ]. This choice will depend on the precise speech recognition software

chosen for use within the speech recognition server 18. The speech recognition process performed by the speech recognition server 18 acts to recognise the user utterance contained within the audio stream received from the audio router server 14, using the recognition grammar for the user to guide the recognition process. Within the embodiment

5 the speech recognition server then returns key information to the recipient determination server via Nuance NL slots (when the Nuance 7 recogniser mentioned earlier is used), so, for example, for the utterance "over and out" the recogniser would return a key value pair of *action=endofcall*, while for "Hi Bob, it's Bob" the recogniser would return two key value pairs: *action=placecall* and *recipient="Bob Smith +447711123456"*, as determined by the

10 user grammar. With the key-value pairs the recogniser also provides a recognition confidence value indicative of how confident it is of any particular recognition leading to a particular key-value pair being correct. Such recognition confidence values are well known in the art.

Having performed the recognition, and output the key-value pairs and confidence values to the recipient determination server, at step 2.20 an evaluation is performed by the recipient determination server on the confidence values of the returned key-value pairs. Here, the confidence values may be compared with a threshold value or the like, and if the evaluation indicates that the recogniser is confident of the results, then processing may proceed to step 2.22. Here, at step 2.22 the recipient determination server 16 sends the DNI(s) of the determined intended recipient(s) and obtained from the received key-value pairs to the audio router server 14, and also, as confirmation, to the visual selector client 104 in the mobile station A. Then, at step 2.24 the audio router server transmits the buffered audio message from the audio buffer 142 to the receiver(s) identified by the DNI(s) received from the recipient determination server, using the PTT communications service. In this case, let us assume that the DNI(s) received from the recipient determination server identifies mobile station B, in which case the audio router server streams the audio message from the audio buffer 142 to the PTT audio client 122 in the mobile station B, over the usual PTT enabled network. At the same time, at step 2.26 the visual selector client 104 at the mobile station A displays the determined DNI(s) to the user A on the display of the mobile station A, as confirmation that the message has been forwarded properly. At that point, therefore, a PTT call has been set up by the audio router server between the mobile station A and the mobile station B, and PTT communications may then continue in a conventional manner.

It is important to note here that it is possible for the speech recognition server to

35 confidently recognise two or more intended recipients, when two or more recipient

identifier's are spoken (consider here the message "Pete, Bob, its Dave here", in which case both Pete and Bob are intended recipients). Due to the recognition grammar both or all of the intended recipient's DNIs may be returned, and due to the confident recognition of both or all it becomes clear that the message was intended for both or all recipients. In 5 such a case the recipient determination server controls the audio router server to set up a group PTT call, to each of the determined intended recipients (Pete and Bob in the example). This feature therefore allows for calling groups for group calls to be defined dynamically, by simply indicating in the message the names of each of the intended recipients which are to be parties to the group call.

10        Returning to step 2.20, if the evaluation performed thereat does not indicate that there is a confident result, then the recipient determination server performs a further evaluation at step 2.28, to determine whether or not there are one or more non-confident results returned from the speech recogniser. If it is the case that no key-value pairs were returned, then the recognition process has failed. In this case the recipient determination 15 server sends a message at step 2.36 to the visual selector client 104 at the mobile station A that recognition has failed, and a recognition failed message is then displayed to the user at the mobile station A. In such a case, the user A must then select the intended recipient for his message using the conventional graphical user interface.

On the contrary, however, if the evaluation of step 2.28 indicates that there are 20 one or more non-confident results, then the user is invited to confirm the one or more non-confident results. Therefore, at step 2.30 the recipient determination server 16 sends a list of the one or more non-confident results to the visual selector client 104 at the mobile station A. Visual selector client 104 then displays the received list to the user on the display of the user on the display of the mobile station A, and at step 2.32 the user selects 25 the intended recipient from the list. The visual selector client 104 then sends the selection information back to the recipient server 16 at step 2.34. The recipient determination server receives the selection information and then returns to step 2.22 wherein the selected DNI (or DNIs where multiple intended recipients are selected) is sent to the audio router server. Processing then proceeds to step 2.24 and onwards as described previously.

30        In view of the above description, therefore, it will be seen that the embodiment of the invention allows for convenient PTT communications without the user having to undergo a specific dialling phase, and waiting for a subsequent connection. In this respect, the invention makes use of the inherent latency in PTT communications, and in particular VoIP implementations thereof, and exploits that latency to perform speech 35 recognition and subsequent intended recipient determination on the message, to allow for

automatic recipient or destination selection. The invention therefore provides an enhanced user experience over and above that provided by the conventional PTT communications services known in the art.

It will be appreciated that various modifications may be made to the described embodiment to produce further embodiments. For example, in a further embodiment in order to initiate the recognition and recipient determination process, the user A at the mobile station A must send an activation signal from the mobile station A, for example by double clicking the PTT button. Such a "double click" would cause the visual selector client A (104) to send an activation signal to the recipient determination server 16, which in turn sends an activation signal to the speech recognition server 18. Such an explicit activation operation may be beneficial to prevent the invention operating in unwanted circumstances.

As another variant, in further embodiments the user A may make a group call using the invention. Group calling using PTT is known *per se* in the art, and is included 15 for use within embodiments of the invention by including within each user address book a group name, together with the associated telephone numbers which form part of the group. In operation, the user A speaks the group name, which is then recognised by the speech recognition server, and the stored group name applied to the user grammar to determine the DNIs for the group. If the group name is recognised, then the recipient 20 determination server sends each of the DNIs belonging to the group to the audio router server 14, which then connects the group PTT call in a conventional manner.

In a further embodiment, the speech recognition server is arranged to recognise only the first few seconds of a message, so as to conserve speech recogniser resources. This feature is based on the premise that for most greetings the recipient name will be said within such a limit (consider the greetings: "Hello, Pete"; "Hi Bob,"; "Good Morning, Pete" etc.). Recogniser time limits of between 3 and 5 seconds should suffice for this purpose.

Regarding the selection of intended recipients in the event of non-confident results, in the embodiment above we describe the visual selector client displaying the shortlist to the user for visual selection. In other embodiments, however, the recipient determination server may include a speech synthesiser program which is used to generate audio prompts relating to the selections available, which are then routed to the PTT audio client 102 at the handset for playing to the user. Note that this may be performed simultaneously with the display of the shortlist by the visual selector client, such that the selections are presented by both audio and visual interfaces, or alternatively

may replace the visual selection. In order to allow for spoken selection by the user of an intended recipient (for example, the user speaks "Yes" when the intended recipient is read out, and/or (optionally) "No" when the name of a non-intended recipient is played, or alternatively the user speaks "Bob Smith" to distinguish between Bob Smith and Bob 5 Jones, previously referred to simply as "Bob"), the PTT audio client may transmit any user response to the speech recognition server via the audio router server for recognition of the responses.

Finally, as a further optional feature the audio router server can be arranged in other embodiments of the invention to trim the audio which has been recognised and used 10 to select the intended recipient from the message, and to transmit only that part of the message which was not used for the intended recipient determination.

Whilst the above description concentrates on the operation of the invention prior to the setting up of a PTT call, in another mode the embodiments of the invention can operate during a PTT call (that is, -within the PTT timeout period when messages are 15 expected to be travelling back and forth between two or more parties to a call) to detect a predetermined "end-call" phrase, such as "Over and out", or "End Call", and to operate to close down the call. In this mode of operation the audio stream routed through the audio router server is copied to the speech recognition server, which performs speech recognition on each sent message to detect the predetermined end-call phrase. Note that 20 more than one end-call phrase may be predetermined, and the speech recognition server may detect any of the predetermined phrases. If such a phrase is detected, the speech recognition server signals the audio router server, which closes down the call. At the same time, the speech recognition server may signal the recipient determination server 16, which may sends "call-ended" signal to the visual selector client 104 at the user terminal. 25 In such a case the visual selector client 104 then displays a "call ended" message to the user on the display screen of the mobile station 10. An audio "call ended" output using a synthesised or stored audio message may similarly be sent to the mobile terminal.

Unless the context clearly requires otherwise, throughout the description and the claims, the words "comprise", "comprising" and the like are to be construed in an inclusive 30 as opposed to an exclusive or exhaustive sense; that is to say, in the sense of "including, but not limited to".

## CLAIMS

1. A communications method comprising the steps of:-  
receiving a voice message containing an utterance;  
5 buffering the received message;  
performing a speech recognition process on the received voice message to recognise the utterance contained therein;  
determining, if possible, an intended receiver of the message in dependence on the recognised utterance; and  
10 if an intended receiver was determined, transmitting the message to the determined intended receiver using a half-duplex communications service provided by a packet-switched network.
2. A method according to claim 1, wherein when the determining step determines 15 one or more possible intended receivers from the recognised utterance, the method further comprises the steps:  
indicating the one or more possible intended receivers to a user; and  
receiving a selection signal from the user indicating the one or more determined possible intended receivers to which the message should be transmitted.  
20
3. A method according to claim 2, wherein the indicating step further comprises generating an audio speech prompt corresponding to the one or more possible intended receivers; and outputting the generated audio speech prompt to the user.
- 25 4. A method according to any of the preceding claims, wherein when the determining step determines a plurality of intended receivers, the message is transmitted to each of the determined receivers using a group call function of the half-duplex communications service.
- 30 5. A method according to any of the preceding claims, wherein the speech recognition process is performed only on a portion of the received voice message.
6. A method according to any of the preceding claims, and further comprising the steps of: receiving an indication of the identity of a user who generated the message; and

selecting a user-dependent speech grammar for use by the speech recognition process in dependence on the identity of the user.

7. A method according to any of the preceding claims, and further comprising the  
5 steps of receiving a speech recognition activation signal from a user, wherein the speech  
recognition and determining steps are performed in dependence on the receipt of such a  
signal.

8. A method according to any of the preceding claims, and further comprising the  
10 steps of: monitoring messages transported by the half-duplex communications service;  
performing a speech recognition process on the monitored messages to determine the  
respective utterances contained therein; and, if it is determined that a predetermined  
utterance is contained in any of the messages, signalling that the half-duplex  
communications service should cease transporting messages.

15

9. A computer program or suite of computer programs arranged such that when  
executed by a computer system it/they cause the computer program to perform the  
method of any of the preceding claims.

20 10. A computer readable storage medium storing a computer program or any one or  
more of a suite of computer programs according to claim 9.

11. A communications system comprising:-

means for receiving a voice message containing an utterance;

25 storage means for buffering the received message;

a speech recogniser arranged in use to recognise the utterance contained within  
the received message;

receiver determination means arranged to determine, if possible, an intended  
receiver of the message in dependence on the recognised utterance; and

30 means for transmitting the message to a determined intended receiver using a  
half-duplex communications service provided by a packet-switched network, if the  
intended receiver was determined.

12. A system according to claim 11, and further comprising:

indicating means for indicating one or more possible determined intended receivers to a user; and

means for receiving a selection signal from the user indicating one or more of the possible determined intended receivers to which the message should be transmitted.

5

13. A system according to claim 12, wherein the indicating means further comprises audio prompt generating means for generating an audio speech prompt corresponding to the one or more of possible intended receivers; and an output for outputting the generated audio speech prompt to the user.

10

14. A system according to any of claims 11 to 13, wherein when the receiver determination means determines a plurality of intended receivers, the means for transmitting is further arranged to transmit the message to each of the determined receivers using a group call function of the half-duplex communications service.

15

15. A system according to any of claims 11 to 14, wherein the speech recogniser operates only on a portion of the received voice message.

20 16. A system according to any of claims 11 to 15, and further comprising: means for receiving an indication of the identity of a user who generated the message ; and grammar selection means for selecting a user-dependent speech grammar for use by the speech recognition process in dependence on the identity of the user.

25 17. A system according to any of claims 11 to 16, and further comprising the steps of means for receiving a speech recognition activation signal from a user, wherein the speech recogniser and receiver determination means are operable in dependence on the receipt of such a signal.

30 18. A system according to any of claims 11 to 17, and further comprising: means for monitoring messages transported by the half-duplex communications service; the speech recogniser being further arranged to perform a speech recognition process on the monitored messages to determine the respective utterances contained therein; the system further comprising signalling means for signalling that the half-duplex communications

service should cease transporting messages, if it is determined that a predetermined utterance is contained in any of the messages.

## ABSTRACT

### Communications Method and System

A communications method and system for use with push-to-talk (PTT)  
5 communications systems, where a speech recogniser is used to recognise utterance in a  
spoken message for transmission by a PTT communications service, and the recognised  
utterance are analysed to attempt to determine the intended recipient of the message. If  
the intended recipient can be unambiguously determined then a PTT call is set up to  
forward the message to the determined recipient. If a plurality of potential recipients are  
10 determined a selection list is displayed to the user to allow the user to select the intended  
recipient.

Figure (1)

15

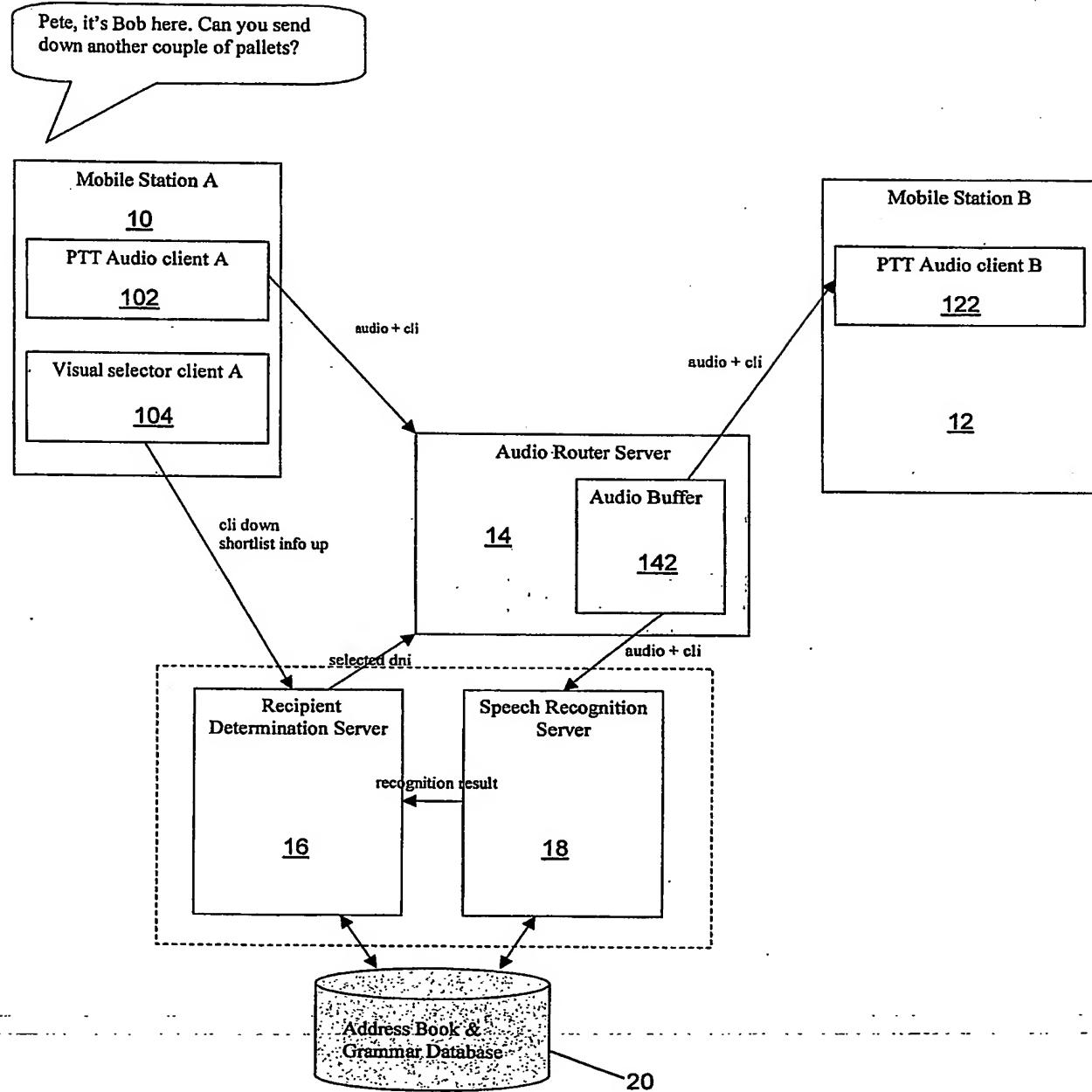
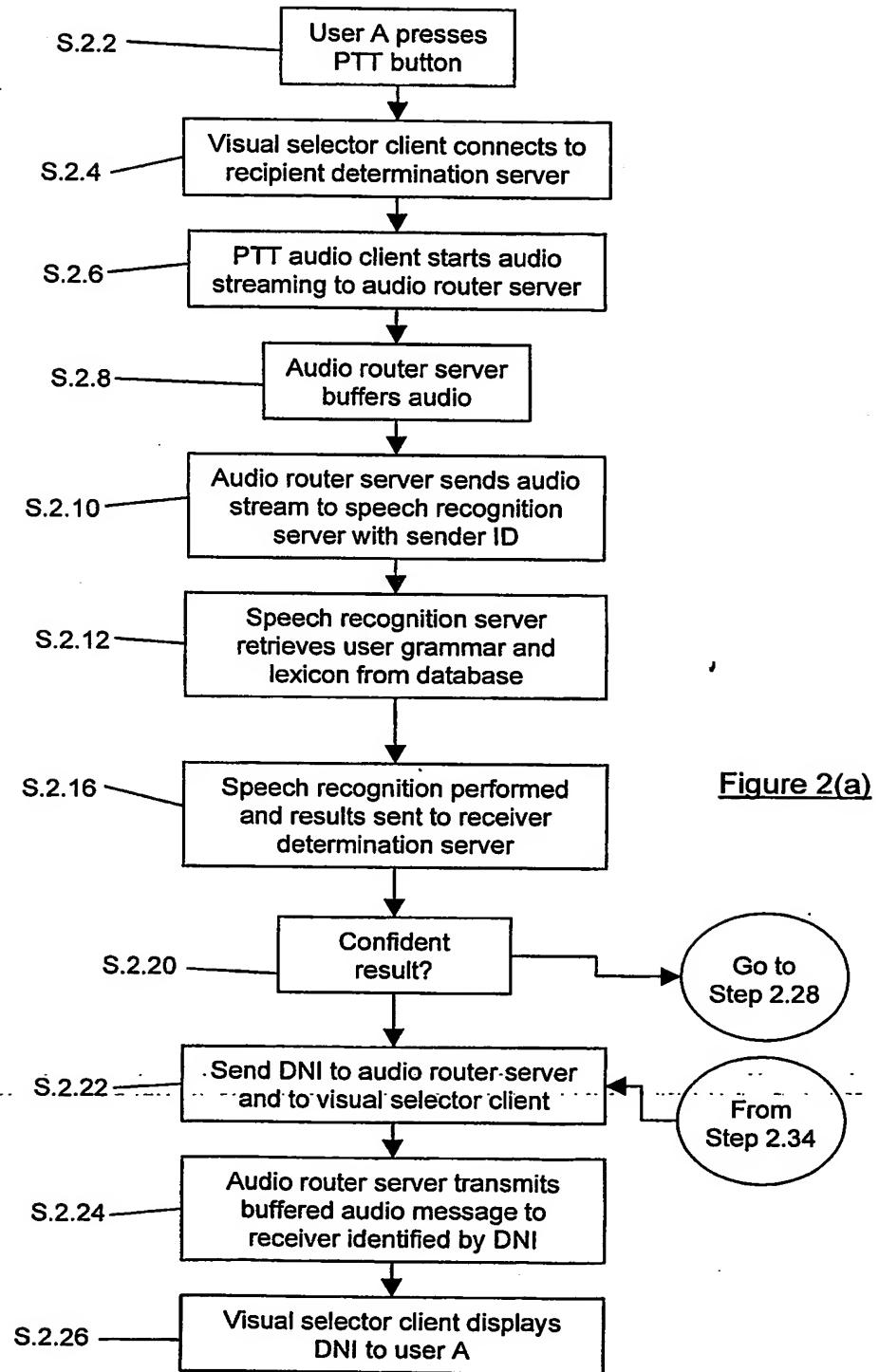


Figure 1



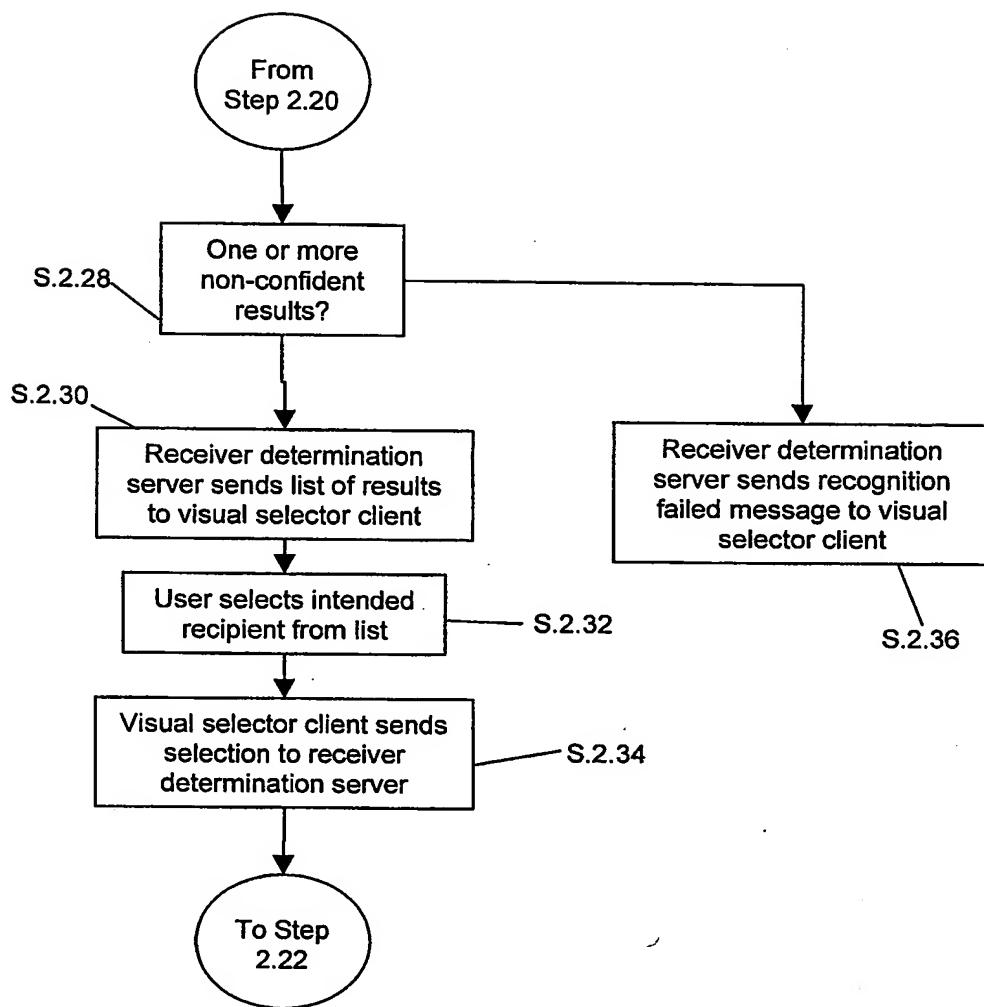


Figure 2(b)

# Document made available under the Patent Cooperation Treaty (PCT)

International application number: PCT/GB04/004970

International filing date: 25 November 2004 (25.11.2004)

Document type: Certified copy of priority document

Document details: Country/Office: GB  
Number: 0328035.1  
Filing date: 03 December 2003 (03.12.2003)

Date of receipt at the International Bureau: 31 January 2005 (31.01.2005)

Remark: Priority document submitted or transmitted to the International Bureau in compliance with Rule 17.1(a) or (b)



World Intellectual Property Organization (WIPO) - Geneva, Switzerland  
Organisation Mondiale de la Propriété Intellectuelle (OMPI) - Genève, Suisse

**This Page is Inserted by IFW Indexing and Scanning  
Operations and is not part of the Official Record**

## **BEST AVAILABLE IMAGES**

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- BLACK BORDERS**
- IMAGE CUT OFF AT TOP, BOTTOM OR SIDES**
- FADED TEXT OR DRAWING**
- BLURRED OR ILLEGIBLE TEXT OR DRAWING**
- SKEWED/SLANTED IMAGES**
- COLOR OR BLACK AND WHITE PHOTOGRAPHS**
- GRAY SCALE DOCUMENTS**
- LINES OR MARKS ON ORIGINAL DOCUMENT**
- REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY**
- OTHER:** \_\_\_\_\_

**IMAGES ARE BEST AVAILABLE COPY.**

As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.